

REMARKS

Reconsideration of the present application is respectfully requested in view of the following remarks. Prior to entry of this response, Claims 1-6 were pending in the application, of which Claims 1 and 4 are independent. In the Office Action dated November 20, 2002, Claims 1-6 were rejected under 35 U.S.C. §103(a), and both the specification and the drawings were objected to. Following this response, Claims 1-6 remain in this application. Applicant hereby addresses the Examiner's rejections in turn.

I. **Objection to the Specification**

In the Office Action dated November 20, 2002, the Examiner objected to the specification because of informalities. The specification has been amended, and Applicant respectfully submits that the amendment overcomes this objection and adds no new matter.

II. **Objection to the Drawings**

In the Office Action, the Examiner objected to the drawings stating that FIG. 1 and FIG. 3 are identical. Applicant respectfully traverses this objection.

Though the basic structure of the FIG. 1 ion source embodiment is similar to the conventional device shown in FIG. 3, the device of FIG. 3 at least is not set up to satisfy $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$. (See page 7, lines 12-23 of the specification.) At least for this reason, FIG. 1 and FIG. 3 are not identical as suggested by the Examiner. Accordingly, Applicant respectfully requests withdrawal of this objection to the drawings.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

III. Rejection of the Claims Under 35 U.S.C. § 103(a)

In the Office Action, the Examiner rejected Claims 1-6 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,554,852 ("Bright") in view of U.S. Patent No. 6,037,717 ("Maishev"). Applicant respectfully traverses this rejection.

Claim 1 is patentably distinguishable over the cited art in that it recites, for example, an ion source comprising a plasma production vessel which serves as an anode, a filament provided on one side of said plasma production vessel, a reflector provided opposite said filament on the other side of said plasma production vessel and kept at a filament potential or a floating potential, and a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel, wherein a relation $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ is satisfied, where the arc voltage applied between said plasma production vessel and said filament is $V_A[V]$, the magnetic flux density of the magnetic field within said plasma production vessel is $B[T]$, and the shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of the plasma production vessel is $L[m]$.

Moreover, Claim 4 is patentably distinguishable over the cited art in that it recites, for example, a method for operating an ion source which comprises a plasma production vessel serving as an anode, a filament provided on one side of said plasma production vessel, a reflector provided opposite said filament on the other side of said plasma production vessel and kept at a filament potential or a floating potential, and a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel, the method comprising a step of

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

leading out an ion beam with the following relation being satisfied, $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ where an arc voltage applied between said plasma production vessel and said filament is $V_A[V]$, a magnetic flux density of the magnetic field within said plasma production vessel is $B[T]$, and a shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of said plasma production vessel is $L[m]$.

In contrast, *Maishev* at least does not teach or suggest, for example, a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel, wherein a relation $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ is satisfied, where the arc voltage applied between said plasma production vessel and said filament is $V_A[V]$, the magnetic flux density of the magnetic field within said plasma production vessel is $B[T]$, and the shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of the plasma production vessel is $L[m]$, as recited in Claim 1. Nor does *Maishev* teach or suggest, for example, leading out an ion beam with the following relation being satisfied, $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ where an arc voltage applied between said plasma production vessel and said filament is $V_A[V]$, a magnetic flux density of the magnetic field within said plasma production vessel is $B[T]$, and a shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of said plasma production vessel is $L[m]$, as recited in Claim 4. *Maishev* at least does not teach or suggest satisfying the relation $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$, rather, *Maishev* merely discloses the observation that electrons held in cross electric and magnetic fields of such a magnitude at which the Larmor radius of an electron (r_e) is approximately equal

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

to an anode-cathode distance (d), whereas the Larmor radius of an ion (r_i) significantly exceeds distance "d". (See *Maishev*, column 6, line 67 through column 7, line 3.)

Furthermore, *Bright* does not overcome *Maishev*'s deficiencies. *Bright* merely relates to apparatus for ion implanting pre-selected ions into a target having improved ion source lifetime and reduced ion beam contamination. Like *Maishev*, *Bright* at least does not teach or suggest, for example, a magnet for generating a magnetic field in a direction of connecting said filament and said reflector within said plasma production vessel, wherein a relation $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ is satisfied, where the arc voltage applied between said plasma production vessel and said filament is V_A[V], the magnetic flux density of the magnetic field within said plasma production vessel is B[T], and the shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of the plasma production vessel is L[m], as recited in Claim 1. Nor does *Bright* teach or suggest, for example, leading out an ion beam with the following relation being satisfied, $L < 3.37B^{-1}\sqrt{V_A} \times 10^{-6}$ where an arc voltage applied between said plasma production vessel and said filament is V_A[V], a magnetic flux density of the magnetic field within said plasma production vessel is B[T], and a shortest distance from a most frequent electron emission point located almost at the tip center of said filament to a wall face of said plasma production vessel is L[m], as recited in Claim 4.

Combining *Maishev* with *Bright* would not have led to the claimed invention because *Maishev* and *Bright*, neither individually nor in combination, at least disclose or suggest the aforementioned recitations of Claims 1 and 4. Accordingly, independent

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

Claims 1 and 4 patentably distinguish the present invention over the cited art, and Applicant respectfully requests withdrawal of this rejection of Claims 1 and 4.

Dependent Claims 2-3 and 5-6 are also allowable at least for the reasons above regarding independent Claims 1 and 4 , and by virtue of their respective dependency upon independent Claims 1 and 4. Accordingly, Applicant respectfully requests withdrawal of this rejection of dependent Claims 2-3 and 5-6.

IV. Conclusion

In view of the foregoing remarks, Applicant respectfully requests the reconsideration and reexamination of this application and the timely allowance of the pending claims. The preceding arguments are based only on the arguments in the Office Action, and therefore do not address patentable aspects of the invention that were not addressed by the Examiner in the Office Action. The claims may include other elements that are not shown, taught, or suggested by the cited art. Accordingly, the preceding argument in favor of patentability is advanced without prejudice to other bases of patentability.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com

Please grant any extensions of time required to enter this response and charge any additional required fees to our deposit account 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: February 19, 2003

By:



D. Kent Stier
Reg. No. 50,640
(404) 653-6559

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com



Application Serial No.: 09/773,664
Attorney Docket No.: 03327.2252

APPENDIX

IN THE SPECIFICATION:

Please replace the paragraph that begins on line 1 of page 4 and ends on line 5 of page 4 with the following paragraph.

As shown in FIG. 1, an [An] ion beam 16 led out of the ion source contains a molecular ion (e.g., P_2^+ , As_2^+), which is an ion like a molecule, besides a monatomic ion (e.g., P^+ , As^+). The molecular ions include, for example, a diatomic ion composed of two atoms, and a triatomic ion composed of three atoms.

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com



CERTIFICATE OF MAILING UNDER 37 C.F.R. § 1.8

I hereby certify that this correspondence is being deposited with the United States Postal Services under 37 C.F.R. § 1.8 on the date indicated below and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231.

on February 19, 2003
Date

Sherleen Goodlette

Attachments:

1. Amendment with Appendix (8 pgs)
2. Post Card to Acknowledge Receipt

FEB 26 2003

TECHNOLOGY CENTER 2800

RECEIVED

FINNEGAN
HENDERSON
FARABOW
GARRETT &
DUNNER LLP

1300 I Street, NW
Washington, DC 20005
202.408.4000
Fax 202.408.4400
www.finnegan.com